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An Economic Analysis of the Impact of Refractive Error in Mozambique

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MOZAMBIQUE EYECARE PROJECT

An economic analysis of the impact of refractive error in Mozambique

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Introduction to Mozambique Eyecare Project (MEP)

- Aims to provide a sustainable solution to the problem of avoidable blindness and promoting eye health through optometric education.

- Focus on human resource capacity development through:
    - Formal optometric education
    - Infrastructure
    - Research
    - Advocacy

- Development of a School of Optometry at Universidade Lurio, Nampula, northern Mozambique.

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Introduction to Mozambique

- Classed as a country with **Low Human Development**
- Ranked **185 out of 186** countries on the HDI (health, education & living standards)
- Life expectancy at birth is **50.7 years**
- Adult literacy rate for both sexes aged 15 and above is 56.1%
- Gross National Income per capita in PPP terms is $906

http://hdrstats.undp.org/en/countries/profiles/MOZ.html - UNDP Human Development Indicators

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Mozambique is a country…

- Whose **improvements on the HDI stood out** relative to the performance of peers
- That has an average annual growth in GNI per capita of **4.1%** (1990 – 2012)
- That has a **dynamic economy** that is doing well in economic growth and trade and **progressing rapidly** on human development.
- That still faces formidable challenges and has significant poverty, but has demonstrated pragmatic policies and a **strong focus on human development**

http://hdr.undp.org/en/media/HDR_2013_EN_complete.pdf - Human Development Report 2013

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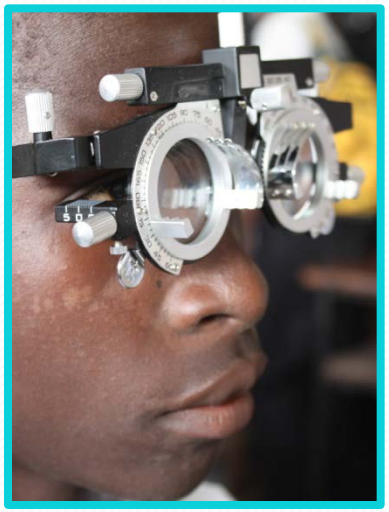
Work to date

Cost Benefit Analysis - in editing stage



Purpose

To estimate the socio-economic benefit of an Optometry Programme by calculating the benefits of addressing refractive error in terms of productivity gained as a result of the intervention.

Methodology

Standard Cost Benefit Analysis based on methodology described in Sinden and Thampapillai (1995).

Sinden J. A. and Thampapillai D. J. 1995, Introduction to benefit-cost analysis,. Longman, Melbourne

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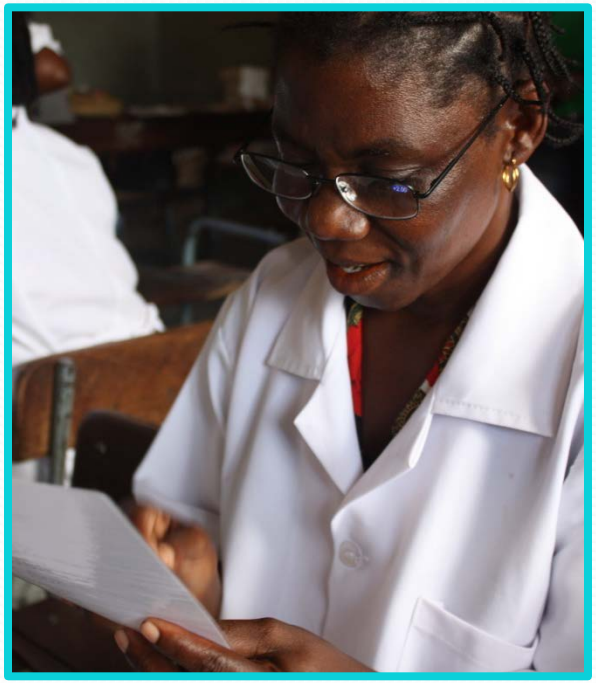
Costs



Costs were calculated using several sources :

- Mozambique Eyecare Project reports
- Budgetary documents
- Current market price information
- National human resources data.

Included all costs associated with:

- The establishment of an optometry degree programme
- Establishing vision centres within public hospitals
- Human resources costs
- Overheads

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Benefits

Benefits were calculated using a Human Capital (HC) approach .

An estimation of impact of URE on individual productivity as a proxy indicator.

Old & new disability weighting compared (Frick & Foster, 2003, Salomon et al 2012).

The potential economic productivity foregone by not addressing refractive errors was measured with calculations informed by:

- Published national economic data
- Labour market data
- Data from functioning optometry clinics in other countries

Frick K, Foster A. 2003, The magnitude and cost of global blindness: an increasing problem that can be alleviated. Am. J of Ophthalmology. 135
Salomon, J. Et al. 2012, Common values in assessing health outcomes from disease and injury. The Lancet, 380

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Benefits

Disability weighting (DW) is a method of quantifying the severity of a disease.

Old GBD disability weights (Frick & Foster 2003)	
Vision impairment	0.245

New GBD disability weights (Salomon et al. 2012)	
Distance vision: mild & moderate impairment	0.0185
Distance vision: severe impairment	0.191
Near vision impairment	0.013

Frick K, Foster A. 2003, The magnitude and cost of global blindness: an increasing problem that can be alleviated. Am. J of Ophthalmology. 135
Salomon, J. Et al. 2012, Common values in assessing health outcomes from disease and injury. The Lancet, 380

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Benefits

Spectacles expected to last four years

In years 1 and 2 it was assumed the spectacles would be 100% effective.

Effectiveness reduced to 75% and 50% for years 3 and 4 respectively to take into account changing prescription and damaged spectacles.

Optometrist to see 15 URE patients a day, 242 days a year

Baltussen R, Naus J, Limburg H. Cost effectiveness of screening and correcting refractive errors in school children in Africa, Asia, America and Europe. Health Policy. 2009; 89: 201 – 215

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Analysis period

VISION 2020 target ratio = 1 person who can refract for every 50,000.

With current population growth (2.3%) and based on 15 optometrists graduating per year (with seven in the pilot year) it would be impossible to ever reach this target.

However it would take until 2049 until there is one optometrist per 100,000 people.

Other cadres may contribute to reducing the URE burden

Analysis period: 2009 - 2049

VISION 2020 The Right to Sight – Global initiative for the elimination of avoidable blindness - Action plan 2006 – 2011.

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Results – costs 2009 – 2049 in 2013 prices

Number	Cost	$	%
1	Expatriate teaching faculty	1,125,000	0.6
2	Local teaching faculty	3,184,408	1.8
3	Programme management costs	5,198,195	2.9
4	School equipment cost	2,180,000	1.2
5	Educational Material costs	311,000	0.2
6	Book costs	123,000	0.1
7	General faculty operating costs	10,069,600	5.6
8	Vision centre equipment costs	12,398,500	6.9
9	Vision Centre Human Resources costs (Optometrists)	100,975,224	56.6
10	Vision Centre Human Resources costs (Technicians)	17,984,402	10.1
11	Vision Centre Human Resources costs (Administrators)	17,984,402	10.1
12	Overheads	6,887,328	3.9
	Total	**178,421,059**	**100.0**

Results

Figures adjusted for the Labour Force Participation Rate (LFPR) and Employment Rate (ER)

Results indicate that as many as 24.3 million patients who are economically productive would have their refractive error corrected by 2049

	Old DW	New DWs
Total cost ($)	178.4 million	178.4 million
Total benefit ($)	18.1 billion	2.3 billion
Total net social benefit ($)	17.9 billion	2.1 billion
Benefit Cost Ratio	114:1	14:1

Vision Loss Expert Group have expressed concern about new DW for Visual Impairment and Blindness (Taylor et al. 2013)

Taylor, H. Et al 2013, Disability weights for vision disorders in GBD study. The Lancet, 381

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Limitations

Costs not included:

- Academic contribution for material
- Local faculty development issues
- Indirect costs – e.g. travel to clinics
- Lenses and frames
- Repairing or replacing equipment

Other barriers to access other than lack of HR

Societal cost of URE

Optometrist graduation rate static but Population growth fixed at current rate (2.3%)

Human Capital approach used – others available

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Conclusion of CBA

Investing in optometry is an economically justifiable choice

Using conservative DWs, the net social benefit is $2.1 billion by 2049

The results complement those of existing literature which suggest that interventions which address URE are cost-effective, including Dandona & Dandona 2001, Ramke et al. 2008, Resnikoff et al. 2008, Holden et al. 2008

- Dandona R, Dandona L. Refractive error blindness. Bulletin of the World Health Organisation. 2001: 79
- Ramke J, et al. Using assessment of willingness to pay... British Journal of Ophthalmology. 2008; 92
- Resnikoff S, et al. Global magnitude of visual impairment... Bulletin of the World Health Organisation 2008
- Holden BA et al. Global vision impairment due to uncorrected presbyopia. Arc. of Ophthal. 2008; 126

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Next steps – literature review

A review will be completed of literature focused on economic analysis of blindness, low vision and eye diseases in the global south published between June 1983 to June 2013.

The literature was identified using PubMed (and possibly other sources). The Medical Subject Headings (MeSH) function is the National Library of Medicine controlled vocabulary thesaurus used for indexing PubMed citations. MeSH will be used to enhance the search.

The search for literature was informed by three layers: economics, health and location.

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Literature review

Economics layer	Health layer	Location layer
Economics [MeSH term]	Blindness [MeSH term]	Developing countr*
	Visual Impairment [MeSH term]	Global south
	Eye diseases [MeSH term]	Medium Human Development
		Low Human Development
		Africa
		Latin America
		Asia
		Poverty
		Poor countr*
		Third world

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Thank you

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